

cells. The lack of demarcation between neck and venter, always notable in Jungermanniales, is here most pronounced. This character, taken in connection with the large number of neck canal cells, seems to suggest that the archegonium is primitive; that while other structures have made rapid strides forward, the archegonium has stood still, relatively speaking. The earliest stages of the embryo were not seen, but in the youngest stage a prominent haustorium, derived most probably from the hypobasal half of the fertilized egg, was present. The foot is not sharply delimited from the seta; this is, of course, a primitive character. The wall of the capsule is 3-layered and the apex is thickened into a pronounced beak, an advanced condition phylogenetically. CAMPBELL considers that *Treubia* is nearer the acrogynous liverworts than is any other anacrogynous form.—W. J. G. LAND.

Botanical microtechnique.—SMITH²⁸ gives a résumé of botanical microtechnique from the time of HOOKE to the present time, and treats the subject under three heads: from HOOKE to 1800; the technique of the English microscopists and the German botanists from 1800 to 1875; modern microtechnique from 1875 to the present time. For the first time the pioneer work of JOHN HILL has received the recognition it merits. HILL was one of the very few workers in botany during the exceptionally barren eighteenth century, and many of his methods were "rediscovered" after nearly 75 years. HILL successfully used maceration methods, and in a crude way fixed and hardened his material. He is beyond doubt the first botanist to use staining as an aid to determine structure, the stain being an alcoholic tincture of cochineal. He also understood and used mordants, injected vessels by boiling pieces of wood in green sealing wax, cut sections on a microtome, and cleared them in spirits of turpentine. The credit of first using paraffin for interstitial imbedding is given to FRANCOTTE, that of soap to PFITZNER, and that of celloidin to BUSSE. The history and evolution of the microtome is traced from 1770 to the present time, but no mention is made of the marvelously accurate rotary microtome which has succeeded that of MINOT.—W. J. G. LAND.

Influence of nutrition on development of sex organs.—NAGAI²⁹ has investigated the influence of nutrition on the development of the sex organs of *Osmunda regalis japonica* and *Asplenium Nidus*. Previously he had shown that factors of environment play important rôles in the sexual development of the gametophytes of *Ceratopteris thalictroides* and other ferns.³⁰ In the present

²⁸ SMITH, GILBERT MORGAN, The development of botanical microtechnique. Trans. Amer. Microsc. Soc. 34:71-129. figs. 18. 1915.

²⁹ NAGAI, ISABURO, On the influence of nutrition upon the development of sexual organs in the fern prothallia. Jour. Coll. Agric. Univ. Tokyo 6:121-164. pl. 10. figs. 7. 1915.

³⁰ NAGAI, ISABURO, Physiologische Untersuchungen über Farnprothallien. Flora 106:281-330. 1913.